Attorney Docket No. **09792909-5824** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	
Yuzuru Fukushima, et al.	Group Art Unit: **1745**
Application No. **10/791,401**	Examiner: **Raymond Alejandro**
Filed: **March 2, 2004**	Confirmation No.: **2557**
For: ELECTROLYTE AND BATTERY USING IT	

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO MARCH 2, 2007 OFFICE ACTION

Dear Sir:

This Amendment is submitted in response to the Office Action mailed March 2, 2007. Applicants respectfully request reconsideration of the application in view of this amendment and remarks herein.

IN THE SPECIFICATION

Please amend the Title as follow:

"ELECTROLYTE HAVING A POLYMER AND BATTERY USING IT"

Please amend the Abstract as follows:

"~~The invention provides an~~ An electrolyte whose battery capacity, cycle characteristics, load characteristics, and low temperature characteristics are all excellent, and a battery using it. A cathode and an anode are layered and wound with a separator and electrolyte layer in between. The electrolyte layer contains ~~a high molecular weight compound and~~ an electrolytic solution containing at least one from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt% to 5 wt% in total and a polymer. Therefore, chemical stability of the electrolyte layer is improved. It is preferable that the electrolytic solution further contains ethylene carbonate and propylene carbonate ~~by~~ with a mass ratio of ~~ethylene carbonate:propylene carbonate =15-75:85-25~~ ethylene carbonate to propylene carbonate ranging from about 15/85 to about 75/25.

IN THE CLAIMS

This listing of the claims replaces all prior listings:

1. (Currently Amended) An electrolyte, ~~wherein~~ comprising:

an electrolytic solution containing at least one selected from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total; and

a ~~high molecular weight compound~~ polymer ~~are contained,~~

wherein,

said polymer is gelatinized with said electrolytic solution, and said electrolytic solution is diffused or held within said polymer, and

said electrolytic solution contains 95 wt % or more of a high dielectric constant solvent.

2. (Currently Amended) An electrolyte according to claim 1, wherein the electrolytic solution further contains ethylene carbonate and propylene carbonate ~~by~~ with a mass ratio of ~~ethylene carbonate:propylene carbonate =15-75:85-25~~ ethylene carbonate to propylene carbonate ranging from about 15/85 to about 75/25.

3. (Original) An electrolyte according to claim 1, wherein the electrolytic solution further contains a nonaqueous solvent and a lithium salt.

4. (Currently Amended) An electrolyte according to claim 3, wherein the lithium salt contains at least one selected from the group consisting of $LiBF_4$, $LiPF_6$, $LiAsF_6$, $LiClO_4$, $LiCF_3SO_3$, $LiN(CF_3SO_2)_2$, $LiN(C_2F_5SO_2)_2$, $LiC(CF_3SO_2)_3$, $LiAlCl_4$ and $LiSiF_6$.

5. (Currently Amended) An electrolyte according to claim 3, wherein the nonaqueous solvent contains any one selected from the group consisting of ethylene carbonate, propylene carbonate, γ-butyrolactone, dimethyl carbonate, diethyl carbonate, ethyl methyl carbonate, dipropyl carbonate, ethyl propyl carbonate, and one wherein hydrogen of ~~these~~ carbonic acid esters is substituted with halogen.

6. (Currently Amended) An electrolyte according to claim 1, wherein the ~~high molecular weight compound~~ polymer contains any one from the group consisting of polyvinylidene fluoride, polyethylene oxide, polypropylene oxide, poly acrylic nitrile, and poly methacrylic nitrile ~~in recurring unit~~.

7. (Currently Amended) An electrolyte according to claim 1, wherein the ~~high molecular weight compound~~ polymer is polyvinylidene fluoride or a copolymer in which hexafluoro propylene is introduced in polyvinylidene fluoride.

8. (Currently Amended) A battery comprising:

a cathode;

an anode; and

an electrolyte,

wherein,

the electrolyte contains an electrolytic solution containing at least one from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total and a ~~high molecular weight~~ compound ~~are contained~~,

said polymer is gelatinized with said electrolytic solution, and said electrolytic solution is diffused or held within said polymer, and

said electrolytic solution contains 95 wt % or more of a high dielectric constant solvent.

9. (Currently Amended) A battery according to claim 8, wherein the electrolytic solution further contains ethylene carbonate and propylene carbonate ~~by~~ with a mass ratio of ~~ethylene carbonate:propylene carbonate =15:75:85:25~~ ethylene carbonate to propylene carbonate ranging from about 15/85 to about 75/25.

10. (Original) A battery according to claim 8, wherein the electrolytic solution further contains a nonaqueous solvent and a lithium salt.

11. (Currently Amended) A battery according to claim 10, wherein the lithium salt contains at least one selected from the group consisting of $LiBF_4$, $LiPF_6$, $LiAsF_6$, $LiClO_4$, $LiCF_3SO_3$, $LiN(CF_3SO_2)_2$, $LiN(C_2F_5SO_2)_2$, $LiC(CF_3SO_2)_3$, $LiAlCl_4$ and $LiSiF_6$.

12. (Currently Amended) A battery according to claim 10, wherein the nonaqueous solvent contains any one selected from the group consisting of ethylene carbonate, propylene carbonate, γ-butyrolactone, dimethyl carbonate, diethyl carbonate, ethyl methyl carbonate, dipropyl carbonate, ethyl propyl carbonate, and one wherein hydrogen of ~~these~~ carbonic acid esters is substituted with halogen.

13. (Currently Amended) A battery according to claim 8, wherein the ~~high molecular weight compound~~ polymer contains any one from the group consisting of polyvinylidene fluoride, polyethylene oxide, polypropylene oxide, poly acrylic nitrile, and poly methacrylic nitrile ~~in recurring unit~~.

14. (Currently Amended) A battery according to claim 8, wherein the ~~high molecular weight compound~~ polymer is polyvinylidene fluoride or a copolymer in which hexafluoro propylene is introduced in polyvinylidene fluoride.

REMARKS

Claims 1 – 14 are pending are under consideration in the above-identified application.

In the Office Action, Claims 1 – 14 were rejected.

In this Amendment, Claims 1, 2, 4 – 9 and 11 – 14 are amended. No new matter has been introduced as a result of this Amendment.

Accordingly, Claims 1 – 14 remain at issue.

I. Objection To Specification

The Title and Abstract have been appropriately amended as requested by the Examiner.

Accordingly, Applicants respectfully request that this objection to the Specification be withdrawn.

II. Objection To Claims

Claims 1, 4 – 6 and 11 – 13 were objected to because of informalities. Applicants have corrected these claims as requested by the Examiner.

Accordingly, Applicants Accordingly, Applicants respectfully request that this objection to the Specification be withdrawn.

III. 35 U.S.C. § 112 Indefiniteness Rejection of Claims

Claims 1-14 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants have appropriately amended the claims at issue, and respectfully request that this objection to the claim rejection be withdrawn.

IV. 35 U.S.C. § 102 Anticipation Rejection of Claims

Claims 1-14 were rejected under 35 U.S.C. § 102(b) as being anticipated by Japanese Publication No. JP 2002-15771, hereafter referred to as JP'771.

Claim 1 is directed to an electrolyte which comprises an electrolytic solution containing at least one selected from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total and a *polymer. The polymer is gelatinized with the electrolytic solution. The electrolytic solution is diffused or held within said polymer, and the electrolytic solution contains 95 wt % or more of a high dielectric constant solvent.*

That is, the electrolyte solution contains at least one selected from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total and a polymer, and contains 95 wt % or more of a high dielectric constant solvent.

By controlling the content of the high dielectric constant solvent and adding vinylethylene carbonate and/or its derivatives, the electrolyte attains a substantially high chemical stability and a substantially high capacity which leads to less swelling of the container of the battery. As such, the battery containing this electrolyte performs with desirable low temperature characteristics and load characteristics.

In contrast, JP '771 discloses that (emphasis added):

> "In the nonaqueous electrolyte possessing the lithium salt by which the 1st nonaqueous electrolyte concerning this invention is dissolved in a non-aqueous solvent and said non-aqueous solvent said non-aqueous solvent *Ethylene carbonate, propylene carbonate*, and gamma-butyrolactone. Ethylene carbonate [as opposed to said whole non-aqueous solvent including the 4th component except said], The rate of *propylene carbonate*, gamma-butyrolactone, and said 4th component, respectively x (volume %), When referred to as y (volume %), z (volume %), and p (volume %), said x, said y, said z, and said p are characterized by filling 15<=x<=50, 2<=y<=35, *30<=z<=85*, and 0< p<=5, respectively."

Thus, the contents of ethylene carbonate and propylene carbonate in the electrolyte taught by JP '771 are in the range of 70 wt % or less based on the fact that the content z of gamma-butyrolactone, given in wt% or volume and is characterized by 30 <=z <=85, which is outside the "95 wt % or more" range of the high dielectric solvent claimed in the present invention.

Therefore, the ratio of the claimed high dielectric solvent is different from the ratio taught by JP '771. Moreover, in contrast to the electrolyte solution disclosed in JP '771, the claimed electrolyte solution does not comprise the gamma-butyrolactone element.

Thus, for at least the above cited differences, Claim 1 is patentable over JP '771, as are dependent Claims 2 – 7, for at least the same reasons.

Independent Claim 8 recites the same distinguishable limitation as that of Claim 1. Thus, Claim 8 is patentable over JP'771, as are dependent claims 9 – 14, for at least the same reasons.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

V. Conclusion

In view of the above amendments and remarks, Applicant submits that all Claims 1 – 14 are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

Dated: 8/10/07 By: _____

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